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ABSTRACT

The research paper discusses seven experiments concerned with interrelations between memory and judgment. Three major hypotheses were explored: (1) the Independence Hypothesis, which states that one's memory is independent of impression; (2) the Verbal Memory Hypothesis, which maintains that transformation of information that one has in memory at the time of judgment determines that judgment; (3) the Integration Hypothesis, which maintains that favorable and unfavorable information are integrated in recall. Specifically, the experiments measured what subjects remembered about a hypothetical person and how the subjects evaluated that person. Information was presented to subjects in the form of adjective traits about a hypothetical person. After being given various instructional sets, subjects were asked to evaluate the person, and to recall and evaluate the information presented. Findings indicated that the Independence Hypothesis was not supported but that a mediating relationship exists between memory and judgment, as postulated in the Verbal Memory Hypothesis and the Integration Hypothesis. Implications of this finding are explored for the educational process, which has traditionally shown a major bias towards the Independence Hypothesis. (Author/DB)

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Final Report

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A SOCIAL-PSYCHOLOGICAL INQUIRY INTO THE RELATION BETWEEN INFORMATION AND VALUE JUDGMENT

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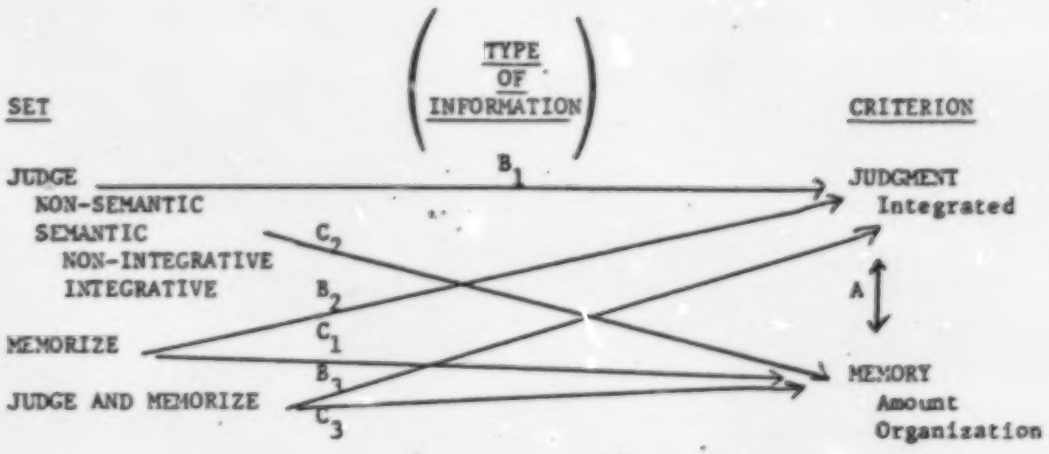
I. Introduction

The research discussed in this Final Report concerns the interrelations between memory and judgment. That is, what is the relation between what we know about something and how we feel about it? The particular topic employed was persons, and the method employed was the impression formation paradigm. Information was presented in the form of adjective traits about a hypothetical person, under varying sets of instructional sets, and Ss were asked, in varying combinations, to evaluate that person, recall the information, or indicate their degree of "agreement" with the information.

In the research proposal, the logical possibilities concerning the relation between information and values were spelled out, and a literature review was undertaken. It was noted that the major bias in twentieth century thinking, and in education, specifically, was the Independence position--namely, that information (what we know about something) and values (how we judge or evaluate something) are essentially independent of each other. This position has profoundly influenced both the structure of academia and its disciples at all educational levels and, in particular, the philosophy of teaching.

The purpose of this research was to test empirically the independence notion, and more broadly, to explore the relations between the memory for and the evaluation of information. The results of the seven experiments described in the Method section of this report will be discussed within the organizational schema of Figure 1. First, we will discuss the correlational interrelations between memory and judgment (the Independence Hypothesis) in Part A. Then the effects on judgment of the different instructional sets to process this information will be discussed in Part B (the Memory Hypothesis). Finally, the effects on memory of the different instructional sets will be examined in Part C (the Integration Hypothesis).



A. Memory and Judgment (The Independence Hypothesis)

B. Prediction of Evaluation Judgment
   1. The Set to Judge
   2. The Set to Memorize (The Memory Hypothesis)
   3. Combine Set to Judge and Memorize

C. Prediction of Memory
   1. The Set to Memorize
   2. The Set to Judge (The Judgment Hypothesis)
   3. Combine Set to Judge and Memorize

Figure 1. Schematic of the effects of different instructional sets on judgment and memory that were investigated in this study.

II. Method

Table 1 sketches the designs of the seven experiments.

Experiment 1.

In the first experiment all Ss were presented one set of the same 12 adjective traits. A third of the Ss received instructions to form an impression only, with no warning for recall (Impression); another third received instructions to recall only, with no warning for impression (Recall); the final third were instructed to both form an impression and recall the traits (Impression and Recall).

Half of each instruction group was presented the traits in blocks of high favorability adjectives followed by low favorability adjectives (HL Order), and half received the reverse order (LH Order).

Of the six groups thus generated, all received final instructions, after set presentation, to both recall and form an impression of the traits. Half of each group responded in the Impression-Recall order, and half in the order Recall-Impression. In this experiment, then, the three variables--Instructions, List, and Response--generated 12 groups of 16 Ss each.

Experiments 2, 3, and 4.

Following the single set of Experiment 1, all Ss received eight additional sets. For these sets Impression and Recall instructions were used throughout. Furthermore, all Ss responded to each set with both trait recall and impressions, half of the Ss in each output order. One-third of the 192 Ss of Experiment 1 was assigned to the eight sets of Experiment 2, one-third to the eight sets of Experiment 3, and one-third to the eight sets of Experiment 4. In Experiments 2 and 3 all sets were of length 10.

In Experiment 2, Ss were divided in half according to initial, preset instructions concerning how to recall the traits. Half were told to recall the traits in any order (Free Recall), and half were told to try to recall the traits in the order they were presented (Ordered Recall). The List variable was a within-S variable; that is, each S received four sets in an HL blocked order and the same four sets in the reverse, LH, order.

Experiments 3 and 4 employed variations in the List variable (see Table 1). In Experiment 3, while half the Ss received the "symmetrical" HL and LH blocked sets, the other half received "skewed" HN and NH (LN and NL) blocked sets, where N refers to traits of "neutral" favorability. In Experiment 4, half the Ss received sets of length six, and half received sets of length 12. In addition, each S presented four sets that were blocked H and L sets and four sets that were randomly arranged H and L sets.

Procedure and Response Measures for Experiments 1, 2, 3, and 4.

Subjects were tested in groups of four per experimental session. Adjective traits were presented visually via a Bell & Howell projector at

Table 1. Summary of Designs of All Experiments

	Instructional Set	Task Variables			Response Variables
Exp I	Impression Recall Combined Impression and Recall	HL Order LH Order			Impression Recall Agreement
Exp II	Combined Impression and Free Recall Combined Impression and Ordered Recall	HL Order LH Order			Impression Recall Agreement
Exp III	Combined Impression and Recall	HL Order LH Order	Skewed Symmetrical		Impression Recall Agreement
Exp IV	Combined Impression and Recall	HL Order LH Order	List Length	Blocked Mixed	Impression Recall Agreement
Exp V	Impression Recall Combined Impression and Recall	HL Order LH Order	Delay of Response (0,10,30 secs.)		Impression Recall
Exp VI	Impression Recall Trait Ratings Spelling Ratings	Mixed List	Delay of Response (0,30 mins.)		Impression Recall
Exp VII	Impression Recall Trait Ratings	Mixed List	List I List II	Delay of Response (0,30 mins.)	Impression Recall

the rate of 5 seconds per trait. Following both the impression and recall responses of each set, S was presented all the traits of the set and asked to indicate for each trait how much the trait agreed with his impression of the described person.

Impression judgments were made on an 8-category rating scale from Highly Unfavorable to Highly Favorable. Recall was recorded by having Ss write the recalled traits on paper. Agreement ratings were made by having S write a number from 1 to 20 alongside each trait corresponding to the strength of agreement.

Experiment 5.

In this experiment appropriate controls allowed for a comparison of the direct effects of impression formation upon recall, as well as the effect of recall on impression formation. Moreover, the design allowed a comparison of recall and impression processes over time of delay.

In all three groups (n=24 per group) subjects were presented with the same stimulus conditions, with each group having a different set of task conditions. For one-third of the subjects (n=20), stimulus sets were presented with instructions to the subject to recall the data only (Recall Only Condition). For another third of the subjects (n=20), instructions were to form impressions only (Impression Only Condition). For another third of the subjects (n=20), instructions were to both form an impression and recall the information (Impression and Recall Condition).

Half of the 30 stimulus sets for all groups consisted of sets containing four highly favorable (H) and two highly unfavorable (L) traits. The remaining half of these sets consisted of four highly unfavorable and two highly unfavorable traits. For both the predominately favorable and predominately unfavorable sets, half of the sets were presented such that the H traits preceded the L traits (4H2L and 2H4L sets), while the remaining half of the sets were presented in the reverse order (2L4H and 4L2H sets). In order to obtain data relevant to the effects of delaying the impression and recall tasks, a counting task was used that required subjects to count backwards from a three digit number by threes for either 0, 10, or 30 seconds immediately following each trait set.

Experiment 6.

Stimulus Materials. Each set contained an equal number of M+ and M- traits (7 of each). Traits were randomly ordered within each set, and each trait was in capital letters on its own slide.

Presentation of Materials. Each slide was presented for a period of 5 seconds on a screen at the front of the room.

Instruction Conditions. Subjects were run under one of three instruction conditions. In Intentional Recall (n=21) subjects were told that they would be viewing a list of adjectives. Their task was to memorize the adjectives. They were informed that they would later be asked to recall as many of the adjectives as they could remember. In the Impression Condition (n=21), standard impression task instructions were given to the effect that

the traits described one person, each trait came from a different person, etc. No recall instructions were given. In the Trait Favorability condition (n=20), subjects were told to indicate how favorable each trait was as it appeared on the screen. No recall instructions were given. In the Spelling Condition (n=18), subjects were told to indicate how difficult the trait would be for students to spell. No recall instructions were given.

Recall. All Ss recalled the set traits both immediately following set presentation and after a 30-minute delay filled by an interviewing task.

Experiment 7.

Experiment 7 extended Experiment 6 to the presentation of two lists of M+ and M- traits. List 2 was presented immediately following List 1. Three of the four Instruction Conditions of Experiment 6 were included: Intentional Recall (n=30), Impression (n=30), and Trait Favorability (n=30). In other respects, the procedure was as in Experiment 6.

Delay of Recall. Half the Ss in all conditions of Experiment 7 recalled the traits both immediately following set presentation and again after an interviewing task of 30 minutes (Immediate-Delayed Condition). The other half of the Ss recalled the traits only after an interviewing task of 30 minutes (Delayed-Only Condition).

Materials.

All traits were selected randomly from preselected ranges of 555 scaled personality traits.

Subjects.

Subjects were drawn from male and female students in the Introductory Psychology class in the School of Social Sciences at the University of California, Irvine.

III. Results and Discussion

The tables of means and analyses of variance of the seven experiments are given in the Appendices to this report and will be referred to there. To facilitate presentation, results by experiment will not be given here, but rather we will follow the general purview of Figure 1.

A. Memory and Judgment

Experiment 1 was designed to intercorrelate measures of impression judgment, verbal recall, and "agreement" (how much Ss agreed that the information characterized their impression of the person described). Each S was presented one set of 14 traits only (7H and 7L traits) in either an HL or LH order, where recall was either warned or unwarned and impression judgment was either warned or unwarned.

The overall correlation between recall (Sum of H-recalled minus Sum of L-recalled) and impression judgment was .14 ($n=192$, $p < .05$). While this small overall correlation is significant statistically, when the conditions are further broken down, the correlation is significant only when impression judgment is unwarned--that is, when Ss believe the task to be a recall task only until after set presentation (see Exp 1, Table 1). Furthermore the correlation is significant only when recall follows the impression judgment, but not when recall precedes the impression.

When recall is weighted by the extent of agreement with the trait recalled, the overall correlation climbs to a .44 ($n=192$, $p < .01$). This result constitutes evidence that the relation between recall and judgment is mediated and not direct (Cognitive Transformation Postulate; see discussion).

In the case of all correlational data, the absolute correlations were substantially higher when impressions were correlated with H-traits alone than with L-traits alone. The favorable information recalled is hence a better overall guide to one's impression than is the unfavorable information recalled.

If impression is warned and recall is unwarned (prior to set presentation), the H and L information may be expected to be more integrated in recall if integration is taking place. If so, then recall output should be clustered less by Hs and Ls than would be expected when impression is unwarned and recall is warned. Employing Bousfield's ratio of repetition clustering measure, it was found that this was indeed the case. Warned Recall-Unwarned Impression yielded a ratio of .49 (Exp 1, Table 2).

Finally, we noted that there was no difference in recall when recall was warned or unwarned, as long as instructions to form an impression occurred. In fact, recall was half an item better when Impression only was warned, as opposed to warned Recall only (Exp 1, Table 2). This incidental learning phenomenon will be further explored in Section C.2.

B. Prediction of Evaluative Judgment

1. The Set to Judge Only. In this section we are concerned with the set (or instructions) to form an impression judgment only upon the impression judgment as a function of task variables. In regard to the effect of

order of presentation, the experiments which contained the Impression Only condition showed an overall primacy order effect as is the usual case under "standard" presentation conditions for the impression formation task (Exps 1 and 5, Tables 2 and 7).

In Experiment 5, changes in impression were examined as a function of time of delay after set presentation. Time of delay was either 0, 10, or 30 seconds following set presentation, where the intervening task was a "counting backwards" task. When Ss were given Impression Only instructions and where each S judged 30 sets, results depended upon which half of the experimental session judgments was obtained.

During the first half of the experimental session, it was noted that as the duration of the counting task increased, there was a shift from impression primacy to impression recency. Thus, delay of the impression response during the first half of the experimental session resulted in a shift from initial traits having the greater weight to later traits having greater weight in judgment. During the second half of the experimental session, this pattern was reversed; namely, as the duration of the counting task increased, a shift from impression recency to impression primacy was observed. Thus, in the Impression Only Condition, order effect changes were found in abundance (Exp 5, Table 7).

2. Combined Set to Judge and Recall. When these impression results are compared to the impression results for the Impression and Recall Condition of Experiment 5, the effect of recall instructions on the impression task can be observed. Impression results for the Impression and Recall Condition showed a complete absence of impression order effects. Thus, the effect of joint impression and recall instructions is to completely wipe out all impression order effects (Exp 5, Table 7). The only effect remaining is the overall impression difference between predominately positive (4H, 2L) and predominately negative (4L, 2H) sets, but even this effect dissipated over the time of delay condition.

Experiments 3 and 4 (Tables 4-6) investigated list variables under the combined set to judge and recall. In both experiments reliable overall primacy effects were obtained in impression judgments when sets were blocked (that is, when Hs and Ls were presented in separate blocks, which arrangement we refer to as "blocked sets"). In Experiment 4, each S judged both blocked sets and sets which were "mixed" (randomly arranged Hs and Ls). Ss also were asked to give agreement ratings of each trait in the set (Exp 4, Table 6). It was found that for blocked sets, agreement ratings reliably decrease from the first to the second block. However, there is no such decline (or a less steep decline) in agreement over traits within the mixed sets. It appears that primacy of impression is reflected by primacy of agreement with individual traits, and, therefore, evidence accrues for the Cognitive Transformation Postulate, whereby the specific information is transformed during the process of integration. Experiment 4 also compared sets of length 6 with sets of length 12. Both sets produced an overall primacy, and the agreement results were similar for both set lengths with respect to blocked vs. mixed sets.

In forming an impression of another person, one usually bases the evaluative judgment on a mixture of affectively different information. Experiment 3 was an attempt to determine the effects of affective differences on impression formation, where Ss again received instructions to both recall and judge the information. There appear to be two levels at which one can approach the problem.

At one level, affective similarity and affective differences are based on the evaluative sign of the information in a description. At this level, all favorable information is assumed to be signed positively (+), all unfavorable information is assumed to be signed negatively (-), and all neutral information is assumed to be unsigned. Thus, in order to create a description in which an affective mixture is present, it is necessary to combine traits of opposing signs. Similarly, in order to create a description in which an affective mixture is absent, it is necessary to either have all traits of the same sign or a mixture of positive or negative traits with neutral traits.

At the second level, affective similarity and affective differences are defined in terms of the distance between the evaluative or affective values of the traits. At this level, the kind of evaluative distance is not as important as the evaluative distance itself.

In Experiment 3 an attempt was made to study the effect of the kind of an affective mixture while maintaining a constant evaluative difference at the second level described. For half of the subjects, "skewed" stimulus sets were constructed such that each set consisted of either highly favorable and neutral information, or highly unfavorable and neutral information. For the remaining half of the subjects, "symmetrical" stimulus sets were constructed such that each set consisted of moderately favorable and moderately unfavorable personality trait adjectives. The composition of all stimulus sets was such that the evaluative distance between the two types of traits in each set was the same for all sets. Thus, any effect due to the second type of affective mixtures mentioned above was controlled for.

Results indicated that for both skewed and symmetrical sets, a primacy impression order effect obtained (Exp 3, Table 4). Furthermore, analysis of agreement data for the individual traits revealed that Ss gave higher agreement ratings to traits in the first half of the stimulus set than to traits in the second half, regardless of whether the sets were skewed or symmetrical. These results support the contention that evaluative distance between traits is more critical than the difference between the affective signs of the traits.

3. The Set to Memorize (The Memory Hypothesis). In Experiment 1 we presented the condition where the evaluative judgment of the described person is an "incidental" task. That is, Ss were instructed only that they will be presented a list of traits and that they will be tested for trait recall. Only after trait presentation are Ss asked to consider the traits to be descriptive of a person and to give their impression of him. We have already indicated under section A above that Ss in this Recall Only condition appear to integrate the input in a different manner than do Ss presented the traits for an impression prior to input (Impression Only

condition). These results showed that in the Recall Only condition Ss will group or cluster the Hs and Ls separately for the purpose of recall, while Ss in the Impression Only show a greater tendency to mix or "integrate" the Hs and Ls together in input (as reflected in recall clustering).

The Verbal Memory Hypothesis, given in its strongest form, states that our evaluation of a person (or topic) is based solely on the information we have about the person (or topic) in store at the time of judgment. Experiment 2 was designed to test this hypothesis directly by independently manipulating the contents of storage at the time of evaluative judgment. Instructions indicated that S was to both recall and form an impression. Half the Ss were given Free Recall Instructions (to recall in any order), while half were given Ordered Recall Instructions (to recall in the order in which the traits were presented). Hence Ordered Recall Ss should have in store more traits from the first part of the set than should Free Recall Ss (as verified--Exp 2, Table). According to the Verbal Memory Hypothesis, then, Ordered Recall Ss should yield a greater primacy effect in impression than Free Recall Ss. This prediction was verified (Exp 2, Table 3). Furthermore, Ordered Recall Ss showed greater agreement with traits in the first half of the sequence than did Free Recall Ss.

C. Prediction of Memory

1. The Set to Memorize. This section concerns the usual memory task with intentional learning instructions. Experiments 1, 5, 6, and 7 contain this condition. However, we are only interested in this condition as comparative to the recall effects of (a) the combined set to judge and memorize, and (b) the set to judge. We only indicate here that in all experiments the set to memorize only always produced a lower overall mean recall than did either of the other instructional sets, although not always reliably so.

2. Combined Set to Judge and Memorize. In Experiment 1, the combined set produced a mean recall of 6.8 items (out of 12), while the Recall Only set produced a mean of 6.2 items. Recall Clustering (by Hs and Ls) was approximately the same in both groups (Exp 1, Table 2).

Experiment 5 compared the Combined Set with the Recall Only Set in detail. Ss in both conditions were given 30 sets of size 6 over the experimental session. Mean recall for the Combined Set was 2.81 items, and for the Recall Only Set 2.68 items (not significantly different; see Exp 5, Table 7). For both conditions there was an overall decline of recall (build-up of proactive interference) from the first half of the experimental session to the second half. Experiment 5 also included a delay of recall manipulation, where recall occurred either at 0, 10, or 30 seconds after set presentation. This produced a reliable decline in mean recall for both groups over the time intervals as follows: 0 sec.: 3.1, 10 secs.: 2.7, 30 secs.: 2.4 (Exp 5, Table 7). This decline was reliably steeper in the second half of the session than in the first part. Finally, both groups showed significant primacy effects in recall, such that the first half of each set was recalled better than the latter half of each set.

3. The Set to Judge (The Integration Hypothesis). Finally, we come to the situation where the recall task is an incidental learning task, in that Ss are instructed only that they will be asked to give an impression judgment of the set traits. Hence amount recalled is incidental to the ostensible task. Experiments 1, 6, and 7 contained this condition.

In Experiment 1, Judge Only Ss (incidental Ss) recalled a mean of 6.46 items, while Recall Only Ss (Intentional Ss) recalled 6.20 items. We earlier noted that Recall Only Ss showed significantly greater clustering scores (of Hs and Ls) than did Judge Only Ss. Experiments 6 and 7 were designed to explore in more detail the surprising lack of superiority of the intentional learners.

Experiment 6 investigated the Impression task more thoroughly as an incidental learning task. Two more conditions were included along with the Recall Only and the Judge Only (Impression) Conditions. The Spelling Condition asked Ss ostensibly to judge the traits presented on how difficult they were to spell. The Trait Favorability condition asked Ss ostensibly to judge the favorability of each trait in the sequence, but not the overall favorability of the traits--as in the Impression condition. Hence we have two types of semantic-processing tasks: a semantic-integrative task (Impression Condition), and a semantic-nonintegrative task (Trait Favorability Condition). In addition, we have a formal, nonsemantic task (Spelling Condition). Thus, there were three incidental learning tasks as well as the intentional task (Recall Only). In addition, we included a delayed (30-minute) condition following the immediate recall condition.

The results of Experiment 6 (Exp 6, Table 9) indicated no differences in recall among the two semantic incidental tasks and the intentional task, but showed a reliable decrement in recall for the formal, nonsemantic task (Spelling Condition). Hence we found no superiority in intentional recall over incidental recall when the incidental task demands semantic processing of the traits.

Experiment 7 was designed to further test the differences among the Impression task, the Trait Favorability task, and the Recall Only task. It was hypothesized that one of the advantages of integration of the traits during input may be to permit better differentiation between two or more persons (or topics), and to provide a better basis for organizing information about different persons (or topics). We refer to this hypothesis as the "Integration Hypothesis." If two lists of traits are presented, then it is predicted that the integrative semantic task (Impression Instructions) would yield superior recall to both the nonintegrative semantic task (Task Favorability) and the Intentional Recall task.

Results of Experiment 7 indicated that the Impression Instructions yielded an average recall of 4.93 items per list, while Trait Favorability and Recall Instructions each produced an average recall of 4.17 items per list (Exp 7, Table 10). Furthermore, the superiority of the recall of the Impression group increased from 1/2 item to over 1 item after a 30-minute delay. These results are construed as support for the Integration Hypothesis.

IV. Conclusions and Implications

In this final section we will outline the conclusions and implications with respect to the three major hypotheses explored.

A. The Independence Hypothesis

The Independence Hypothesis states that the information we have in memory about a person (or topic) is independent of our impression (or evaluation) of that person. This hypothesis was first stated by Anderson and Hubert (1963). The present results lead us to reject the Independence Hypothesis. There is a small but reliable correlation between memory and impression.

The evidence is in favor of what we have termed the Cognitive Transformation Postulate--that memory and judgment are mediated by a transformation or change in meaning (or import) of the information in store. This change in meaning is a by-product of the integration of the information with respect to the to-be-judged person. In other words, it is not what we recall about a person that determines how we judge him, but rather it is what we "make of" that information (or how much we accept or agree with that information).

Inasmuch as agreement with the information presented structures our evaluation, it becomes critical to delineate those factors that govern agreement. (1) When favorable and unfavorable information is presented sequentially in blocked form, we agree more with the information that comes first, thus accounting for the primacy effect in evaluation; (2) the greater the affective conflict among the pieces of information, the less is the average agreement with any piece of information; (3) over time our agreement with positive information decreases and our agreement with negative information increases; and (4) increasing the likelihood of recall of earlier information increases one's agreement with that information. Later research will center around discovering to what extent factors affecting memory also affect our agreement.

1. The Verbal Memory Hypothesis. The strong form of the Verbal Memory Hypothesis states that the information we have in store at the time of judgment completely determines that judgment. The low correlations obtained between memory and judgment argue against this strong form as stated. However, it was found that independently manipulating the probability of recall will affect judgment. That is, in Experiment 2, ordered recall instructions augmented the impression primacy effect. Secondly, in Experiment 5 it was observed that instructions to recall together with instructions to judge affected the distribution of order effects obtained without instructions to recall.

A corrected version of the Verbal Memory Hypothesis, then, would state that the (agreement) transformations that we perform on the information presented through integration of that information in storage, determines our judgment of the person (or topic) described by that information.

B. The Integration Hypothesis

In this section, we are concerned with amount and quality of recall only. When presented favorable and unfavorable information for recall only (without judgment instructions), Ss will tend to use the strategy of clustering favorable information together separately from unfavorable information. With instructions to judge (form an impression of the person described) only, with recall being unwarned and incidental, there is less of a tendency to cluster favorable and unfavorable information separately in recall, and more of a tendency to integrate favorable and unfavorable information . (See Exp 1, Appendix.)

Throughout several experiments we noted a persistent tendency for recall to be superior when Ss were not warned that they were to recall the material. This result was striking, in that generally memory research indicates a superiority of intentional over incidental learning. Experiment 6 demonstrated that as long as information is encoded for meaning (semantic encoding), incidental recall will be at least equal to intentional recall. This result was determined by including a Trait Favorability condition, in which Ss rate each trait separately for meaning, but do not rate their impression of the set as a whole. Thus, whereas the Trait Favorability task is a "nonintegrative" semantic task, the Impression task is an "integrative" semantic task.

This eventuated in the final experiment (Exp 7) which tested the "Integration Hypothesis." The prediction was as follows: although the three tasks--the intentional recall task (Recall Only), the incidental nonintegrative semantic task (Trait Favorability), and the incidental integrative semantic task (Impression)--do not significantly differ in trait recall when one set of traits is presented, the integrative semantic task (Impression) will yield superior recall when more than one set of traits is presented. The reasoning behind the Integration Hypothesis is that the advantage of integration (where Ss make an overall evaluative impression judgment) is to provide superior organization in recall of two trait sets by virtue of a semantic discrimination between sets. In other words, from S's viewpoint, he can keep the two sets separately organized by person (or topic) in the Impression condition, but in the other two tasks he can discriminate only by list discrimination--he has no semantic basis for list discrimination.

Results supported the prediction--namely, that incidental recall under impression instructions was superior to the other conditions (including intentional recall), and this superiority held up over time.

C. Implications for Education

The typical learning procedure in education at all levels involves the sequential presentation of several topics, each topic requiring the integration of information. The primary implication of the present research findings is at first flush a rather radical one: students may be expected to learn more when asked to evaluate the topics presented in the classroom

(with no anticipation of recall testing) than they would if asked to learn the information for later testing. For example, in a geography course, if the purpose of the course was for the student to come to a reasoned evaluation of, say, how much he would like to live in each country discussed by the teacher, the present research implies that he would learn more about these countries than if he were presented information about the countries for testing only.

This implication presumes (1) that the laboratory results can generalize to the classroom, and (2) that information about a "person" can generalize to information about any "topic." The author is currently putting this implication to test in his own classes under an Instructional Improvement Grant from the University of California. The hypothesis I am testing is that students will learn more about course topics when asked to evaluate those topics (anticipating no examination) than when asked to absorb the information for examination.

I recently began searching the literature for an equivalent finding to the present incidental learning result, to no avail. I then heard a paper read at the 1975 APA Meetings by Hamilton and Katz who obtained similar results quite unintentionally. Later I ran across a paper by one of the leaders in the field of memory research, James Jenkins of the University of Minnesota, whose reformulation of the field of memory was much in line with my own thinking. In rejecting the "Associationist" view and in describing his new "contextualist" view of learning and memory, Jenkins states:

> "It was impressively clear that the most important determinant of recall was the nature of the event the subjects experienced when . . . brought into contact with the stimulus . . . . Subjects recall the quality of the events they have experienced, not stimuli to which they have been exposed."

Should the hypothesis be further supported in the classroom, some implications are as follows: (1) The test-performance mentality of courses could be sharply reduced. (2) The involvement of students in the educational process could be vastly improved, with no increase in instructor time, by emphasizing that the student's major purpose is to discern how he evaluates the topics presented in relation to his own affective experience, thus resulting in his knowing more about himself. (3) The student would derive more knowledge from the course, and more knowledge that was integrated into his experience than simply separate pieces of knowledge. Presumptuously speaking, it may become possible to redefine education as the development of awareness of oneself and one's relationship to knowledge, rather than as a one-way conveyor belt of facts into an empty container. Under such a definition, the gap between facts and values (between what we know about something and what we feel about it)--a gap unsupported by empirical data--may begin to narrow.

Table 1 (Exp 1). Correlations between Impression and Recall (H Recall - L Recall), between Impression and Weighted Recall (Weighted by Agreement ratings), and between Impression and H Recall or L Recall alone.

	Recall	Weighted Recall	H Recall	L Recall
All Ss (n=192)	.14*	.44*	.13*	-.06
Warned Recall, Warned Impression (n=64)	.10	.42*	.02	-.11
Warned Recall, Unwarned Impression (n=64)	.23*	.52*	.29*	.01
Unwarned Recall, Warned Impression (n=64)	.08	.38*	.04	-.08
Impression - Recall Order (n=96)	.23*	.17	.35*	.08
Recall - Impression Order (n=96)	.06	.66*	-.07	-.17*

*$p < .05$

Table 2 (Exp 1). Amount recalled (of list of 12), and Amount of Clustering of Hs and Ls separately (Ratio of Repetition) under the different instructional conditions.

	Recall	Clustering
Warned Impression/Unwarned Recall	6.5	.49
Unwarned Impression/Warned Recall	6.2	.58
Warned Impression/Warned Recall	6.7	.61

Table 3 (Exp 2). Mean Impression, Recall, and Agreement for a set size of 10 (5H, 5L), as a function of Order and Instructional Set.

IMPRESSION (0-6)

	HL Order	LH Order
Free Recall	3.38	3.25
Ordered Recall	3.93	3.53

RECALL (0-5)

	First Block	Second Block
Free Recall	3.02	2.87
Ordered Recall	3.24	2.68

AGREEMENT (1-20)

	First Block	Second Block
Free Recall	11.24	10.91
Ordered Recall	11.89	10.57

Table 4 (Exp 3). Mean Impression, Recall, and Agreement as a function of Symmetrical vs. Skewed Sets.

IMPRESSION (0-6)

	Relatively Positive to Negative Order	Relatively Negative to Positive Order
Symmetrical (HL) Sets	3.97	3.51
Skewed Sets (HN,LN)	3.45	3.19

RECALL (0-5)

	First Block	Second Block
Symmetrical (HL) Sets	3.31	3.41
Skewed Sets (HN,LN)	3.13	3.06

AGREEMENT (0-20)

	First Block	Second Block
Symmetrical (HL) Sets	12.8	11.7
Skewed Sets (HN,LN)	14.4	13.5

Table 5 (Exp 3). Analyses of Variance of the three response measures (df = 1,60 for all effects) produced these F values.

	IMPRESSION	RECALL	AGREEMENT
Symmetrical vs. Skewed (S)	4.8*	5.0*	6.8*
Positive-Negative Order (P)	11.9*	.6	2.5
First vs. Second Block (F)		.0	18.3*
Impression-Recall vs. Recall-Impression Order (I)	3.1	6.4*	2.3
SP	.9	6.6*	.0
SF		1.5	.2
SI	.2	.3	.1
PF		4.0*	3.6
PI	.9	3.0	3.1
FI		.4	3.6
SPF		4.7*	.7
SPI	2.0	2.0	1.6
SFI		1.3	.8
PFI		.9	.8
SPFI		3.1	3.5

*$p < .05$

Table 6 (Exp 4). Mean Response to Sets of Sizes 6 and 12 as a function of whether H and L traits were blocked or mixed.

IMPRESSION (0-6)

	6-Sets		12-Sets	
	HL	LH	HL	LH
Blocked Sets	3.85	2.71	3.75	3.20
Mixed Sets	3.15	2.74	3.40	3.75

AGREEMENT (1-20)

	6-Sets		12-Sets	
	First Half	Second Half	First Half	Second Half
Blocked Sets	12.8	10.3	11.8	10.1
Mixed Sets	11.9	11.6	11.7	10.8

RECALL (0-3 for 6-Sets, 0-6 for 12-Sets)

	6-Sets		12-Sets	
	First Half	Second Half	First Half	Second Half
Blocked Sets	2.49	2.14	3.5	3.6
Mixed Sets	2.40	2.02	3.4	3.2

Table 7 (Exp 5). Mean Response for Impression and Recall as a function of Instructional Condition, Time of Delay, and First vs. Second Half of the Experimental Session.

IMPRESSION (0-6)

Time of Delay (Seconds)	Impression Only				Impression plus Recall			
	First Half		Second Half		First Half		Second Half	
	HL	LH	HL	LH	HL	LH	HL	LH
0	3.2	2.7	2.9	3.5	3.6	3.3	2.9	3.2
10	3.0	3.2	3.0	3.3	3.4	3.1	3.3	3.1
30	3.2	3.3	3.4	3.2	3.1	3.1	3.2	2.9

RECALL

Time of Delay (Seconds)	Impression plus Recall		Recall Only	
	First Half of Session	Second Half of Session	First Half of Session	Second Half of Session
0	3.2	3.1	3.0	3.1
10	2.9	2.6	2.9	2.6
30	2.8	2.2	2.4	2.3

Table 8 (Exp 5). Analyses of Variance of Impressions and Recall showing F-values. (Degrees of Freedom of the F-value are 1 and 46, unless Time of Delay is implicated; in that case df = 2, 92.)

	RECALL	IMPRESSION
Recall Only vs. Impression plus Recall (G)	.3	
Impression Only vs. Impression plus Recall (G)		.1
Time of Delay Interval (I)	36.0*	.3
HL vs. LH Order (P)	4.1*	.0
First vs. Second Half of Experimental Session (T)	8.1*	.0
GT	2.7	3.9*
GP	.0	1.3
TP	.5	2.2
GI	.4	2.0
TI	3.2*	.0
PI	.0	.4
GTP	1.9	.3
GTI	1.0	4.1*
GPI	1.8	1.0
TPI	1.8	4.9*
GTPI	.2	.3

Table 9 (Exp 6). Number Recalled of a 16-item list as a function of Intentional Recall and Incidental (Impression, Trait Favorability, and Spelling) Conditions.

		Delay of Recall			
		Immediate		Delayed	
		First Half of List	Second Half of List	First Half of List	Second Half of List
Instructional Condition	Recall Only (Intentional)	4.52	3.38	4.24	2.90
	Impression	4.50	3.67	4.33	2.94
	Trait Favorability	3.95	4.85	3.75	3.95
	Spelling	3.38	3.48	2.76	3.00

Table 10 (Exp 7). Amount of Recall following two consecutive lists immediately and after a 30-minute delay as a function of Intentional and Incidental Learning Instructions.

			Delay of Recall			
			Immediate		Delayed	
			List I	List II	List I	List II
Instructional Condition	Recall Only (Intentional)	Immed.-Del.	5.80	4.40	5.80	3.80
		Delayed Only	--	--	4.47	2.00
	Trait Favorability	Immed.-Del.	4.40	5.73	4.27	3.93
		Delayed Only	--	--	4.00	2.53
	Impression	Immed.-Del.	4.87	6.13	5.07	5.07
		Delayed Only	--	--	4.57	3.87